

CLAIMS

What is claimed is:

- 1 1. A computer implemented method comprising:
2 determining a process' state; and
3 indicating from a process state manager to a plurality of processes changes in
4 the process' state.
- 1 2. The computer implemented method of claim 1 wherein the determining the
2 process' state comprises:
3 receiving a request for a communication key when the process starts and
4 restarts; and
5 determining expiration of a time period for receiving a heartbeat message when
6 the process dies.
- 1 3. The computer implemented method of claim 1 further comprising registering
2 interest of the plurality of processes in the process.
- 1 4. The computer implemented method of claim 1 further comprising managing a
2 communication key for the process and a plurality of communication keys for the
3 plurality of processes.
- 1 5. The computer implemented method of claim 1 further comprising the plurality
2 of processes communicating with the process with a communication key.
- 1 6. A computer implemented method comprising:
2 registering interest of a first process in a second process;
3 determining the second process' state; and
4 notifying the first process when the second process changes state.

1 7. The computer implemented method of claim 6 wherein the second process'
2 state is either alive, dead, or unregistered.

1 8. The computer implemented method of claim 6 wherein the notifying the first
2 process comprises:
3 transmitting a death notification when the second process dies; and
4 transmitting a birth notification when the second process starts or restarts.

1 9. The computer implemented method of claim 6 further comprising:
2 providing the second process a communication key when the second process
3 starts; and
4 transmitting the communication key to the first process.

1 10. The computer implemented method of claim 6 further comprising the first
2 process communicating with the second process with a communication key.

1 11. A computer implemented method comprising:
2 determining a first process has started;
3 providing the first process a communication key;
4 maintaining the communication key and the first process' state; and
5 transmitting the communication key to a second process.

1 12. The computer implemented method of claim 11 wherein determining the first
2 process has started comprises receiving a request for the communication key from the
3 first process.

1 13. The computer implemented method of claim 11 wherein the communication key
2 includes a process identifier and a incarnation identifier.

1 14. The computer implemented method of claim 11 wherein maintaining the
2 communication key comprises creating a unique process identifier when the first
3 process initially starts and updating an incarnation identifier part of the communication
4 key each time the first process restarts.

1 15. The computer implemented method of claim 11 further comprising registering
2 interest of the second process in the first process.

1 16. The computer implemented method of claim 11 further comprising the second
2 process communicating with the first process with the communication key.

1 17. A computer implemented method comprising:
2 receiving a request for a communication key of a first process from a second
3 process;
4 determining the first process' state;
5 if the first process is alive, then transmitting the communication key for the first
6 process to the second process;
7 if the first process has not started, then indicating to the second process the
8 communication key is not available;
9 receiving a message when the first process starts;
10 providing the communication key to the first process; and
11 transmitting the communication key to the second process.

1 18. The computer implemented method of claim 17 wherein the communication key
2 includes a process identifier and an incarnation identifier.

1 19. The computer implemented method of claim 17 wherein the communication key
2 includes an incarnation identifier that is updated each time the first process restarts.

1 20. The computer implemented method of claim 17 further comprising registering
2 interest of the second process in the first process.

1 21. The computer implemented method of claim 17 further comprising transmitting
2 a death notification to the second process when the first process dies.

1 22. The computer implemented method of claim 17 further comprising the second
2 process communicating with the first process with the communication key.

1 23. An apparatus comprising:
2 a processor to execute a process state manager, a first process, and a second
3 process, the process state manager to maintain a first communication
4 key for the first process and a second communication key for the second
5 process and to communicate state changes between the first process and
6 the second process; and
7 a memory coupled to the processor, the memory to store a first state for the first
8 process and a second state for the second process, the first
9 communication key and the second communication key.

1 24. The apparatus of claim 23 wherein the communication key includes a process
2 identifier and an incarnation identifier.

1 25. The apparatus of claim 23 further comprising a second processor to execute a
2 third process, the third process to communicate with the first process and to register
3 with the process state manager.

1 26. The apparatus of claim 23 wherein the process state manager to maintain the
2 first communication key comprises the process state manager to update an incarnation
3 identifier of the first communication key each time the first process restarts.

1 27. An apparatus comprising:
2 a first processor to host a process state manager, the process state manager to
3 maintain a communication key and a state for a process; and
4 a second processor coupled to the first processor, the second processor to host
5 the process, the process to periodically transmit heartbeat messages to
6 the process state manager on the first processor.

1 28. The apparatus of claim 27 wherein the communication key includes a process
2 identifier and an incarnation identifier.
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1 29. The apparatus of claim 27 further comprising the first processor to host a
2 second process, the second process to request a second communication key from the
3 process state manager.

1 30. The apparatus of claim 27 further comprising the first processor to host a
2 second process, the second process to use a second communication key provided by the
3 process state manager to communicate with the process.

1 31. A machine-readable medium that provides instructions, which when executed
2 by a set of processors of one or more processors, cause said set of processors to
3 perform operations comprising:
4 transmitting a request to a process state manager for a first communication key;
5 receiving the first communication key;
6 transmitting signals to the process state manager;

7 requesting from the process state manager a second communication key for a
8 process;
9 if the second communication key is provided, then communicating with the
10 process with the second communication key;
11 if the second communication key is not provided, then requesting notification
12 from the process state manager when the second communication key is
13 available.

1 32. The machine-readable medium of claim 31 wherein the first communication key
2 includes a first process identifier and a first incarnation identifier and the second
3 communication key includes a second process identifier and second incarnation
4 identifier, the second process identifier and the second incarnation identifier
5 corresponding to the process.

1 33. The machine-readable medium of claim 31 further comprising requesting a third
2 communication key to communicate with a third process.

1 34. The machine-readable medium of claim 31 further comprising receiving a death
2 notification when the process dies.

1 35. A machine-readable medium that provides instructions, which when executed
2 by a set of processors of one or more processors, cause said set of processors to
3 perform operations comprising:
4 determining a process' state; and
5 indicating from a process state manager to a plurality of processes changes in
6 the process' state.

1 36. The machine-readable medium of claim 35 wherein the determining the
2 process' state comprises:

3 receiving a request for a communication key when the process starts and
4 restarts; and
5 determining expiration of a time period for receiving a heartbeat message when
6 the process dies.

1 37. The machine-readable medium of claim 35 further comprising registering
2 interest of the plurality of processes in the process.

1 38. The machine-readable medium of claim 35 further comprising managing a
2 communication key for the process and a plurality of communication keys for the
3 plurality of processes.

1 39. The machine-readable medium of claim 35 further comprising the plurality of
2 processes communicating with the process with a communication key.

1 40. A machine-readable medium that provides instructions, which when executed
2 by a set of processors of one or more processors, cause said set of processors to
3 perform operations comprising:
4 registering interest of a first process in a second process;
5 determining the second process' state; and
6 notifying the first process when the second process changes state.

1 41. The machine-readable medium of claim 40 wherein the second process' state is
2 either alive, dead, or unregistered.

1 42. The machine-readable medium of claim 40 wherein the notifying the first
2 process comprises:
3 transmitting a death notification when the second process dies; and
4 transmitting a birth notification when the second process starts or restarts.

- 1 43. The machine-readable medium of claim 40 further comprising:
2 providing the second process a communication key when the second process
3 starts; and
4 transmitting the communication key to the first process.
- 1 44. The machine-readable medium of claim 40 further comprising the first process
2 communicating with the second process with a communication key.
- 1 45 A machine-readable medium that provides instructions, which when executed
2 by a set of processors of one or more processors, cause said set of processors to
3 perform operations comprising:
4 determining a first process has started;
5 providing the first process a communication key;
6 maintaining the communication key and the first process' state; and
7 transmitting the communication key to a second process.
- 1 46. The machine-readable medium of claim 45 wherein determining the first
2 process has started comprises receiving a request for the communication key from the
3 first process.
- 1 47. The machine-readable medium of claim 45 wherein the communication key
2 includes a process identifier and a incarnation identifier.
- 1 48. The machine-readable medium of claim 45 wherein maintaining the
2 communication key comprises creating a unique process identifier when the first
3 process initially starts and updating an incarnation identifier part of the communication
4 key each time the first process restarts.

1 49. The machine-readable medium of claim 45 further comprising registering
2 interest of the second process in the first process.

1 50. The machine-readable medium of claim 45 further comprising the second
2 process communicating with the first process with the communication key.

1 51. A machine-readable medium that provides instructions, which when executed
2 by a set of processors of one or more processors, cause said set of processors to
3 perform operations comprising:
4 receiving a request for a communication key of a first process from a second
5 process;
6 determining the first process' state;
7 if the first process is alive, then transmitting the communication key for the first
8 process to the second process;
9 if the first process has not started, then indicating to the second process the
10 communication key is not available;
11 receiving a message when the first process starts;
12 providing the communication key to the first process; and
13 transmitting the communication key to the second process.

1 52. The machine-readable medium of claim 51 wherein the communication key
2 includes a process identifier and an incarnation identifier.

1 53. The machine-readable medium of claim 51 wherein the communication key
2 includes an incarnation identifier that is updated each time the first process restarts.

1 54. The machine-readable medium of claim 51 further comprising registering
2 interest of the second process in the first process.

1 55. The machine-readable medium of claim 51 further comprising transmitting a
2 death notification to the second process when the first process dies.

1 56. The machine-readable medium of claim 51 further comprising the second
2 process communicating with the first process with the communication key.